I claim:

1. A method for monitoring the accuracy of signals generated by an encoder, comprising the step of determining a difference between two signals generated by an encoder that translates positional information into signals, wherein a value of the difference greater than a threshold value is indicative of a signal error.

2. The method of claim 1, further comprising the step of generating an error signal when the value of the difference between the two signals is greater than the threshold value.

3. A method for monitoring the accuracy of signals generated by an encoder, comprising the steps of:
   (i) providing an encoder that translates positional information into signals that correspond to the position translated by the encoder;
   (ii) reading a first signal at a first point in time;
   (iii) reading a second signal at a second point in time; and
   (iv) determining an absolute value of a difference between the first signal and the second signal, and comparing the determined value with a threshold value.

4. The method of claim 3, wherein the encoder is an optical encoder.

5. The method of claim 3, wherein the encoder is an absolute encoder.

6. The method of claim 3, wherein the encoder is an incremental encoder.

7. The method of claim 3, wherein steps (ii), (iii), and (iv) are performed by a computer.

8. The method of claim 3, wherein the signals are read at a rate greater than the rate at which the encoder translates the positional information into the signals.

9. The method of claim 3, wherein the threshold value corresponds to a value greater than the difference between two consecutive signals produced by the encoder.

10. The method of claim 3, wherein the signals are digital signals and the threshold value corresponds to the number of bits of information that change between two consecutive signals.

11. The method of claim 3, further comprising the step of generating an error signal when the difference calculated in step (iv) is greater than the threshold value.

12. A method for monitoring the accuracy of signals generated by an encoder, comprising the steps of:

(i) providing an encoder that translates positional information into computer-readable signals, wherein the positional information corresponds to a code word of a code disk of the encoder;

(ii) sampling the positional information of the encoder at a rate that is greater than the rate at which the encoder changes from a first code word to a second code word; and

(iii) processing the computer-readable signals of step (i) to determine the difference of bits between two code words of the encoder, wherein a difference greater than a threshold value indicates a signal error.

13. The method of claim 12, wherein the encoder is an absolute encoder.

14. The method of claim 12, wherein steps (ii) and (iii) are performed by a computer.

15. The method of claim 12, further comprising a step of generating an error signal if the difference determined in step (iii) is greater than the threshold value.

16. The method of claim 12, further comprising a step of determining whether the difference determined in step (iii) is greater than the maximum distance measured by the encoder in a complete revolution.

17. The method of claim 12, wherein the encoder comprises a plurality of code disks having a modified gray code thereon.

18. A method for monitoring the accuracy of signals generated by an optical encoder, comprising the steps of:

(i) providing an optical encoder that translates positional information into computer-readable signals;

(ii) sampling the positional information of the optical encoder at a rate greater than the rate at which the encoder produces the positional information for two positions being translated;

(iii) processing the computer-readable signal produced in step (ii); and

(iv) determining a value of the difference between two consecutively measured signals produced by the encoder, wherein a difference greater than a threshold value indicates a signal error.

19. The method of claim 18, wherein the optical encoder is an absolute encoder.

20. The method of claim 18, further comprising a step of generating an error signal when the difference of step (iv) is greater than the threshold value.

21. A method for detecting an error from an absolute encoder comprising the steps of:

(i) providing an absolute encoder that translates positional information using a modified gray code;

(ii) setting a threshold value corresponding to an acceptable difference of bits of information between gray code words, wherein each gray code word differs by only one bit of information between the two adjacent gray code words;

(iii) reading a first gray code word at a first point in time;

(iv) reading a second gray code word at a second point in time;

(v) determining the absolute bit difference between the first and second gray code words; and

(vi) generating an error signal if the difference of step (v) is greater than the threshold value of step (ii), wherein an error signal indicates a signal error from the absolute encoder.

22. An encoder apparatus comprising:

(a) at least one signal emitter;

(b) at least one signal receiver; and

(c) means for monitoring the accuracy of signals generated by the encoder by determining the difference between two signals from the encoder, and determining whether the difference is greater than a threshold value.

23. The encoder apparatus of claim 22, wherein the signal emitter is a light emitting diode.

24. The encoder apparatus of claim 22, wherein the signal receiver is a phototransistor.

25. The encoder apparatus of claim 22, in which the encoder is an absolute optical encoder, which comprises at least one code disk between the signal emitter and the signal receiver.

26. The encoder apparatus of claim 25, wherein the at least one code disk contains a plurality of code words in a gray code format.

27. The encoder apparatus of claim 25, comprising two code disks.

28. The encoder apparatus of claim 22, wherein the means for monitoring the accuracy of signals generated by the encoder is a component of a computer system in communication with the encoder.

29. The encoder apparatus of claim 22, wherein the means for monitoring the accuracy of signals generated by the encoder generates an alarm signal when a signal error is detected.

30. The encoder apparatus of claim 22, wherein the means for monitoring the accuracy of signals generated by the encoder is a microprocessor provided with the encoder.

31. An encoder apparatus comprising:

(a) at least one signal emitter;

(b) at least one signal receiver to receive signals from the signal receiver; and

(c) a difference calculator in communication with the signal receiver.

32. The encoder apparatus of claim 31, wherein the difference calculator determines the difference between a plurality of signals received by the signal receiver.

33. The encoder apparatus of claim 31, in which the encoder is an absolute optical encoder, which comprises at least one code disk between the signal emitter and the signal receiver.

34. A combination of an encoder and a computer system comprising

(a) an encoder, which comprises at least one optical signal emitter and at least one optical signal receiver;

(b) a computer system, which comprises at least one computer in communication with the optical encoder such that requests can be made from the computer to the encoder, and signals corresponding to positional information can be transmitted by the encoder to the computer; and

(c) means for monitoring the accuracy of the signals generated by the encoder by determining the difference between two signals from the encoder, and determining whether the difference is greater than a threshold value.

35. The combination of claim 34, wherein the means for monitoring the accuracy of the signals generated by the encoder comprise computer instructions implemented by the computer.

36. The combination of claim 34, in which the encoder is an absolute optical encoder, which comprises at least one code disk positioned between the signal emitter and the signal receiver.

37. The combination of claim 36, wherein the code disks include a plurality of concentric tracks containing opaque and non-opaque areas, each of the areas corresponding to a bit of information.

38. The combination of claim 37, wherein the code disks include a plurality of radial increments, each increment corresponding to a unique pattern of opaque and non-opaque areas such that each increment differs by only one bit of information.